# CO<sub>2</sub> Laser Cutting Centers



High-Speed Laser Cutting Centers with Two CO<sub>2</sub> Lasers

TRUMATIC HSL 2502 C / 4002 C



### Pure Productivity: Two Cutting Heads Plus High Speed

With the TRUMATIC HSL 2502 C / 4002 C, TRUMPF has extended its range of highspeed laser cutting centers. The concept behind this machine is as brilliant as it is simple: high productivity with linear drive technology coupled with two lasers and two laser cutting heads.

The TRUMATIC HSL 2502 C / 4002 C are high-speed laser cutting centers with linear drives. The machines are equipped with two TRUMPF CO<sub>2</sub> lasers each with outputs of 3200 watts, enabling synchronous machining with two cutting heads.

#### High Productivity – Lower Part Costs

This machine design allows you to profit fully from the benefits of linear drive technology. The enormously powerful acceleration and axis speed, combined with the two cutting heads, mean that production performance is greatly increased.

Highly productive manufacture of thin sheet metal parts is one of the great strengths of this machine.

Part throughput can reach three times that of a single-head machine.

With thin steel plate, part costs can be reduced by more than half.

The available laser output naturally enables thicker sheets to be worked too. This not only makes the machine highly productive but also enables flexible reactions to frequently changing material types and thicknesses.



#### Machine Design

The design of this machine is oriented especially towards the use of high-dynamic linear drives. The machine frame of the TRUMATIC HSL 2502 C / 4002 C is a welded steel construction of one piece, and is very compact.

The motion unit is made from low-weight mild steel, combining high rigidity with low weight.

The machine design fulfills all the requirements for ergonomic work sequences. The front side of the machine is accessible along its entire length. Access is via a fast-opening lifting door, so that loading and unloading operations can be carried out comfortably. The two large macrolon windows in the lifting door provide a clear view of the machine's working area at all times. The sheets are fed to the machine on pallets via the automatic pallet-changer, and after machining is over, the pallet with the finished parts is removed from the machine.

To enable comfortable part removal parallel to production, the pallet is accessible on three sides.



Wherever quick and flexible machining of medium to large runs is involved, the TRUMATIC HSL 2502 C / 4002 C will give you the edge you need.



### Part Spectrum: High Quality – Mass Produced



The laser is a multifunctional tool. Its strength is the machining of all kinds of different materials in the thin and thick sheet sectors. Part geometry can be simple or complex.

#### **Areas of Application**

Use the TRUMATIC HSL 2502 C / 4002 C wherever subcontracted jobs can be dealt with fas-ter and more cheaply using two cutting heads. And the machine doesn't only save you money in the thin steel sector during production of medium to large series.

### **New Fields of Application**

The TRUMATIC HSL 2502 C / 4002 C also gives you the opportunity to tap new industries and new fields of application. Take advantage of its production potential, combined with the flexibility of the laser, to manufacture such things as:

- Prototypes and variants for the electrical industry
- Blade components for the clutch or lamp industry
- Seals, e. g. for special series
- Elements for hydraulics and pneumatics
- Multi-contoured car body components
- Series parts such as saw blades, flanges or front plates for the appliance industry.



Flat blanks for small series can also be economically produced if they result in lower tool costs and shorter delivery times.

The laser beam machines everything until it is virtually ready for assembly. Additional support is provided by the programming system ToPs – because ToPs "knows" precisely how each material has to be machined.

The TRUMATIC HSL 2502 C / 4002 C are primarily used for cutting applications, but the laser beam can do a whole lot more than that: marking parts for identification purposes, for instance, or machining coated blanks. High-speed cutting in thin sheet metal

# Cutting Speed and Cut Quality are Decisive

Technologies especially developed for TRUMPF machines ensure that you get the best results during laser processing.

SprintLas: increases machining speed by optimizing processing sequences in thin sheet metal.

■ PSS (Plasma Sensing System) monitors process safety during the cutting of thick stainless steel.

■ High Pressure Cutting: oxide and burrfree cut edges on stainless steel and aluminum alloys via high-pressure cutting.

■ Thick sheet machining: processing to perfection means utilizing special approach techniques for process-safe cutting and cutting of small holes in thick sheets.

Corner machining: Dynamic Power Control, corner cooling, looping, rounding in the corner sections. Choose your method depending on the material and requirements.

Common Line Cutting: in combination with ToPs 100, machines can nest parts such that one cut line defines two parts, reducing processing time.

Microweld: fixing of workpieces – even of thick material – in the metal sheet via tiny spot welds.









Oxide-free cut edges in stainless steel

*High-volume production all the way to thick sheets* 

### Linear Drives: High Dynamics and Precision



Linear drives are utilized wherever high demands are placed on speed, acceleration and contour accuracy. Permanent magnets are located along the axis, and a slide unit moves above them. The constant air gap between the permanent magnets and the slide unit ensures that that the dynamics experience next to no friction. The power achieved from the magnetic flow via a change in the coil current enables high dynamics and powerful drive force.

The X and Y axes on the TRUMATIC HSL 2502 C / 4002 C are driven in a linear fashion. In the Y direction, two linear drives are coupled together electrically – not mechanically. The precise control of the axes is taken over by a direct-operation measurement and adjustment system. This provides the linear drives with their very high degree of accuracy.

### Two Cutting Heads: Parallel – for Double the Productivity



The two cutting heads are arranged on the X axis and can be positioned as desired. The distance between the two cutting heads is adjusted via program control. Each cutting head is supplied by its own TLF laser, ensuring constant cut quality across the entire working area.

■ The capacitive height regulation DIAS separately regulates the cutting distance from the metal for each cutting head. Optimal cutting results, even with uneven sheets, are a matter of course.

■ DIAS detects the center of sheets. Manual repositioning is therefore no longer necessary, and this also avoids scratching.

The cutting heads can of course be operated individually as well. Machining takes place either with the two cutting heads parallel to each other, or with one cutting head on its own.

### The Two Lasers: Reliable and Economical



The TRUMPF TLF lasers are RF-excited gas lasers. The resonator has been folded into a square. This enables an ultra-compact design and long service life. An extremely silent and low-vibration turbo-blower is utilized for gas circulation. TRUMPF lasers have proven themselves thousands of times over in tough everyday industrial use. They feature optimal beam quality combined with infinitely adjustable laser output and low gas consumption thanks to RF technology.

#### Automatic Focus Adjustment

The laser beam is guided to the cutting head along a fully encapsulated guideway. The adjustment mechanism AutoLas *Plus* keeps the focus position steady for both cutting heads and ensures that it is adjusted to match the requirements posed by different materials and material thicknesses.

### Programming Precisely Tailored to the Machine



Mature machine technology also means uncomplicated programming. ToPs 100 is a CAD/CAM development from TRUMPF. The machine and the programming system are optimally tailored for one another:

Drawings generated in ToPs or imported into ToPs 600 via CAD systems.

Order-driven nesting.

Automatic machining of nested sheets at the touch of a button.

■ Know-how included: ToPs contains our technological know-how, and all machining parameters and data are stored in technology tables. ToPs "knows" which cutting parameters are suited to which material, and gives you optimal cutting results every time.

## Loading and Unloading – Systematically



The TRUMATIC HSL 2502 C / 4002 C are fitted with an automatic pallet changer as standard, which enables the machine to be loaded and unloaded parallel to processing.

### Automatic Loading:

The loading facility enables fast loading and easy handling, even with heavy blanks.

#### **Automatic Production:**

Automation of loading and unloading operations is handled by the LiftMaster. The sheets are conveyed from the raw material stack to the pallet changer using suction cups. An unloading rake then transports finished workpieces and sheet skeletons from the machine to the finished part stack.

The LiftMaster naturally enables unattended operation to be carried out over several hours, e.g. in a second shift.

HSL 2502 C

### HSL 4002 C



## **Technical Data**

#### Machine

### **TRUMPF TLF RF** excited CO<sub>2</sub> Lasers

	TRUMATIC HSL 2502 C	TRUMATIC HSL 4002 C	TLF 3200	
Working Area <sup>1</sup> X x Y Z-Axis (DIAS)	2500 x 1250 mm 115 mm	2500 mm x 4000 mm 115 mm	Guaranteed max. output per laser	3200 W Programmable in 1 percent steps
Max. sheet thickness Mild steel Stainless steel Aluminum	20 mm 12 mm 8 mm	20 mm 12 mm 8 mm	No. of lasers	2 10.6 um
Workpiece Max. workpiece weight Max. workpiece size	500 kg 2050 x 1250 mm	1600 kg 2050 x 4000 mm	Beam mode Consumption value	TEMoo Jes
<b>Max. speeds</b> Axis parallel Simultaneous	215 m/min > 300 m/min	215 m/min > 300 m/min	per laser Laser gas CO <sub>2</sub> N <sub>2</sub> He	1 l/h 6 l/h 13 l/h
Accuracy <sup>2</sup> Smallest programmable increment Positioning accuracy Repeatability	0.01 mm ±0.1 mm ±0.03 mm	0.01 mm ±0.1 mm ±0.03 mm	Cutting gas per laser O <sub>2</sub> Laser cooling system	500 - 2000 l/h Closed circulation
<b>Dimensions and weights</b> Length Width Height Weight Power consumption of entire installation	6300 mm 8900 mm 2640 mm 11600 kg 38 - 72 kW/h	15300 mm 5800 mm 2640 mm 14000 kg 42 - 76 kW/h		
Control TRUMPF CNC control	Basis Sinumerik 840D	Basis Sinumerik 840D		

<sup>1</sup> On machines with automation, the working range in Z direction is reduced by 25 mm.
 <sup>2</sup> According to German standard VDI/DGQ 3441. Measured length 1 m. Workpiece tolerances depend (among other things) on the workpiece type, pretreatment, sheet size, and location in the working area.

TRUMPF is certified in accordance with German standard DIN EN ISO 9001



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